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Algebraic Number Theory and Related Topics 2010

edited by Masanari Kida, Noriyuki Suwa and Shinichi Kobayashi

July, 2012

**Research Institute for Mathematical Sciences
Kyoto University**

RIMS Kôkyûroku Bessatsu B32

Algebraic Number Theory
and
Related Topics 2010

December 6 ~10, 2010

edited by Masanari Kida, Noriyuki Suwa and Shinichi Kobayashi

July, 2012

Research Institute for Mathematical Sciences

Kyoto University, Kyoto, Japan

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Preface

The RIMS workshop “Algebraic Number Theory and Related Topics 2010” was held at Research Institute for Mathematical Sciences of Kyoto University from December 6 to December 10, 2010. The workshop was organized by Masanari Kida (University of Electro-Communications), Noriyuki Suwa (Chuo University) and Shinichi Kobayashi (Tohoku University).

The aim of the workshop was to overview recent developments in diverse branches of number theory: algebraic number theory, arithmetic geometry, automorphic forms and so on. The conference program included 27 talks in various areas of number theory and we had 161 participants during the conference. Two talks by Professors Arai and Ihara in the Wednesday session were dedicated to late Professor Fumiyuki Momose, who passed away on April 26, 2010.

This volume of RIMS Kôkyûroku Bessatsu edited by the three organizers is a collection of articles contributed by the invited speakers of the conference. They are divided into three categories: research announcements, survey articles and research articles for the convenience of reading and referring. Each paper was refereed by experts and is in final form.

The organizers would like to express their gratitude to everyone who contributed to the success of the conference and especially to the contributors and the anonymous referees of the articles of this volume who provided their excellent jobs on a tight schedule.

June 2012

Masanari Kida
Noriyuki Suwa
Shinichi Kobayashi

Program

Algebraic Number Theory and Related Topics 2010

Date December 6 (Mon), 2010 - December 10 (Fri), 2010

Place Room 420, Research Institute for Mathematical Sciences, Kyoto University

December 6 (Mon)

- 9:55 – 10:00 Introduction
- 10:00 – 10:50 Anna Cadoret (Univ. Bordeaux 1)
Representation over finite fields of etale fundamental groups of
curves (joint work with Akio Tamagawa)
- 11:00 – 11:50 Kazuaki Miyatani (University of Tokyo)
Finiteness of crystalline cohomology of higher level
- 12:00 – 12:30 Manabu Yoshida (Kyushu University)
Takashi Suzuki (The University of Chicago)
Fontaine's property (P_m) at the maximal ramification break
- 14:00 – 14:50 Shin Hattori (Kyushu University)
Ramification correspondence of finite flat group schemes of equal
and mixed characteristic
- 15:00 – 15:50 Ahmed Abbes (CNRS)
Ramification and cleanliness
- 16:10 – 17:00 Takeshi Saito (University of Tokyo)
 ℓ -adic Riemann-Roch formula

December 7 (Tue)

- 10:00 – 10:50 Takashi Hara (University of Tokyo)
On non-commutative Iwasawa main conjecture for totally real
fields
- 11:00 – 11:50 Tatsuya Ohshita (Kyoto University)
On the higher Fitting ideals of Iwasawa modules of class groups
over real abelian fields
- 12:00 – 12:30 Yoshitaka Sasaki (Kinki University)
Poly-Euler numbers and the related L -function

- 14:00 – 14:50 Byoung Du Kim (Victoria University of Wellington)
Two-variable p -adic L -functions for modular forms at non-ordinary primes
- 15:00 – 15:50 Florian Sprung (Brown University)
The p -parts of Tate-Shafarevich groups of elliptic curves
- 16:10 – 17:00 Shinichi Kobayashi (Tohoku University)
The p -adic Gross-Zagier formula at supersingular primes

December 8 (Wed)

- 9:30 – 10:20 Takahiro Tsushima (University of Tokyo/Keio University)
Stable model of the modular curve $X_0(p^4)$
- 10:30 – 11:20 Keisuke Arai (Tokyo Denki University)
Galois images and modular curves
- 11:30 – 12:20 Yasutaka Ihara (Kyoto University)
Automorphy of Galois representations; where it is helpful and where not

December 9 (Thu)

- 10:00 – 10:50 Tsuyoshi Itoh (Chiba Institute of Technology)
Yasushi Mizusawa (Nagoya Institute of Technology)
Manabu Ozaki (Kinki University)
On the \mathbf{Z}_p ranks of tamely ramified Iwasawa modules
- 11:00 – 11:50 Keiichi Komatsu (Waseda University)
Takashi Fukuda (Nihon University)
Takayuki Morisawa (Waseda University)
On λ -invariants of \mathbf{Z}_l -extensions over real abelian number fields with conductors of 2-powers
- 12:00 – 12:30 Akiko Ito (Nagoya University)
On the 3-divisibility of class numbers of certain quadratic fields
- 14:00 – 14:50 Ryoko Oishi-Tomiyasu (High Energy Accelerator Research Organization)
On a correspondence between the relative class group of a CM-field and equivalent classes of Pfister forms

- 15:00 – 15:50 Yifan Yang (National Chiao Tung University)
Cuspidal rational torsion subgroups of $J_1(N)$
- 16:10 – 17:00 Teruyoshi Yoshida (University of Cambridge)
On the global Langlands correspondence for $GL(n)$

December 10 (Fri)

- 10:00 – 10:50 Ken-ichi Yoshikawa (Kyoto University)
Analytic torsion and automorphic forms
- 11:00 – 11:30 Michitaka Kojima (Waseda University)
 p -adic numbers and continued fractions
- 11:40 – 12:10 Kenichi Shimizu (Kenmei Girls' Junior and Senior High School)
Imaginary quadratic fields whose exponents are less than or equal to two
- 13:30 – 14:20 Iwao Kimura (University of Toyama)
Sage for number theorists
- 14:30 – 15:20 Takuya Konno (Kyushu University)
Proof of the fundamental lemma in automorphic endoscopy
- 15:40 – 16:30 Ki-ichiro Hashimoto (Waseda University)
Some results on Jacobsthal sum identities

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